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REPORT ON COMMERCIAL INSECTICIDES AND FUNGICIDES 1953

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THE CONNECTICUT AGRICULTURAL EXPERIMENT
STATION, NEW HAVEN, CONNECTICUT



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REPORT ON COMMERCIAL INSECTICIDES AND FUNGICIDES

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INTRODUCTION

The 1923 session of the Connecticut General Assembly passed an act concerning the manufacture, sale and transportation of adulterated insecticides and fungicides that was modeled after the Federal Insecticide Act of 1910. This law has remained unaltered to the present day, except for an amendment (G. S. 877b) requiring certain white insecticides to be artificially colored and a special law (G. S. 878b) restricting the sale of sodium fluoracetate ("1080"). It does not require insecticides and fungicides to be registered, and does not cover rodenticides, weed killers or plant hormones at all. Its text, and the regulations adopted for its enforcement, are given in a special circular issued by the Station in August, 1952.

The law requires analyses of insecticides and fungicides made by this Station to be published in bulletins, either annually or at other intervals as may be advisable. Because no specific appropriation is made for the collection and analysis of samples, it has not been possible to make a complete survey of the entire field of insecticides and fungicides each year, and consequently reports on the analysis of such products have been issued only at intervals of several years.

Prior to 1929 four bulletins [Bulletins 157 (1907); 242 (1922); 258 (1924); 272 (1925)] were published giving analyses made by this Station. In 1929 Bulletin 300, which was a compilation of analyses of commercial insecticides and fungicides from all published sources available to us, was issued. This bulletin included analyses made at this Station between 1925 and 1929. Bulletin 346 was issued in 1933 as a supplement to Bulletin 300; and in 1937, as those two bulletins were out of print, they were replaced and brought up to date by Bulletin 398.

Subsequent publications, like those issued prior to Bulletin 300, have contained only analyses made at this Station. Of such publications there have been two besides the present bulletin: Circular 136, issued in 1939; and Circular 153, which appeared in 1942.

The present bulletin includes analyses made in the period from July, 1942, through December, 1952.

CLASSIFICATION OF MATERIALS

The samples analyzed are classified as follows:

<i>Materials</i>	<i>No. of samples</i>
Arsenate of calcium	1
Arsenate of lead	8
Arsenicals, miscellaneous	7
Arsenic-copper dusts	3
"Benzene hexachloride"	9
Bleaches	46
Chlorine compounds, organic, miscellaneous	9
Copper preparations	6
DDT preparations	26
Dithiocarbamates	4
Fluorine compounds	4
Nicotine preparations	8
Oil, mineral	1
Parathion preparations	7
Pyrethrum preparations	7
Quaternary ammonium compounds	4
Rotenone preparations	19
Sulphur	14
Thiocyanates	4
Miscellaneous	23
Total	210

RESULTS OF INSPECTION AND ANALYSIS

Arsenate of Calcium

7322. *Garden Master Calcium Arsenate.* Sears, Roebuck & Co., Chicago, Ill.

Analysis was as follows:

	<i>Guaranteed Per Cent</i>	<i>Found Per Cent</i>
Total arsenic oxide (As_2O_5)	40.00	41.60
Water-soluble arsenic (As) (official method ¹)	0.49	1.75
Water-soluble arsenic (As) (N. Y. method ²) .....	.....	5.05
Calcium oxide (CaO) .....	.....	40.20

Arsenate of Lead

Eight samples of arsenate of lead were examined. Analyses are given in Table 1.

Arsenicals, Miscellaneous

7135. *Berlou Guaranteed Mothproof.* Manufacturer unknown. Claimed: Active ingredients sodium arsenites, 38.0 per cent; inert ingredients, 98.8 per cent; total arsenic (all in water-soluble form), 0.7 per cent. Found: Arsenic, 0.50 per cent; pH, 7.3.

W.S.-188. *Dolge S.S. Weed Killer.* C. B. Dolge Co., Westport, Conn. Claimed: Active ingredients sodium arsenites, 38.0 per cent; inert in-

¹A.O.A.C. *Methods of Analysis*, 7th Ed., 1950, 5.45.

²Method of Pearce, Norton and Chapman, N. Y. State Agr. Expt. Sta. Bul. 234 (1935).

TABLE 1. ANALYSES OF ARSENATE OF LEAD

Station No.	Manufacturer and Brand	Arsenic Oxide, As ₂ O ₅				Lead Oxide, PbO
		Total		Water-Soluble		
		Guaranteed	Found	Guaranteed	Found	
5139	Baugh & Sons Co., Philadelphia, Pa. <i>Baugh's Powdered.</i>	31.0	.....	0.70	0.02	.....
4637	Eastern States Farmers' Exchange, Inc., West Springfield, Mass. <i>Powdered</i>	30.0	.....	0.38	0.09	.....
7723	General Chemical Co., Baltimore, Md. <i>Orchard Brand Powdered.</i>	.....	.....	.....	0.28	.....
8583	General Chemical Co., Baltimore, Md. <i>Orchard Brand Powdered with Astringent.</i>	30.0	30.97	0.75	0.26	62.96
3406	Manufacturer unknown.	.....	33.11	.....	.....	64.64
6150	Manufacturer unknown.	.....	32.33	.....	.....	63.53
2661	Sherwin-Williams Co., Oakland, Calif. <i>Standard.</i>	30.0	32.18	0.75	0.15	64.64
7321	Sherwin-Williams Co., Cleveland, O.	30.0	33.45	0.75	0.32	64.82

gredients water, 62.0 per cent; total arsenic (all water-soluble), 24.5 per cent. Found: Arsenic, 25.37 per cent.

4735. *G & O Anti-Beetle Formula for Lawn and Golf Green*. Goulard & Olena, Inc., Skillman, N. J. Analysis was as follows:

	Guaranteed Per Cent	Found Per Cent
Lead (Pb)	5.97	5.83
Total arsenic (As)	4.00	6.53
Water-soluble arsenic (As)	0.75	0.81
Total nitrogen (N) .....	.....	1.33
Total phosphoric acid (P_2O_5) .....	.....	4.84
Insoluble phosphoric acid (P_2O_5) .....	.....	1.73
"Available" phosphoric acid (P_2O_5) .....	.....	3.11
Soluble potash (K_2O) .....	.....	0.33

Microscopic examination showed bone, castor pomace, tobacco and sand present.

1694 and F.S.-710. *Lilly's Ant Cups*. Lilly Products Co., Attleboro, Mass. Claimed: Active ingredient sodium arsenate, 3 per cent; total arsenic (in water-soluble form), 1.2 per cent. Found: Arsenic, 0.58 and 1.02 per cent (two samples).

4622. *Substance Used for Grub-Proofing Lawns*. Manufacturer unknown. This was an alkaline light pinkish-brown powder with a fertilizer odor containing lead and possibly calcium arsenate, sand, and some iron and aluminum; soluble arsenic pentoxide (As_2O_5), 1.52 per cent.

4707. *Zotox Crab Grass Killer*. Garden Products Co., St. Louis, Mo. Analysis was as follows:

	Per Cent
Arsenic acid (H_3AsO_4)	44.30
Arsenious acid (H_3AsO_3)	0.28
Dye, probably Light Green SF Yellowish	trace
Water by difference	55.42

Arsenic-Copper Dusts

2655. *Dust to Control Tomato Blight*. Manufacturer unknown. Analysis showed: Arsenic, 3.15; copper, 4.18; lead, 0.12; and clay, 76.70 per cent; antimony present.

7327. *Hydroxide*. Mechling Bros. Chemicals Division of General Chemical Co., Camden, N. J. Analysis was as follows:

	Guaranteed Per Cent	Found Per Cent
Total arsenic oxide (As_2O_5)	19.20	20.06
Water-soluble arsenic (As)	1.50	2.06
Copper (Cu)	12.75	14.50

7326. *Orchard Brand Paris Green*. General Chemical Co., New York, N. Y. Analysis was as follows:

	Guaranteed Per Cent	Found Per Cent
Total arsenious oxide (As_2O_3)	50.00	53.38
Water-soluble arsenic (As)	2.65	1.05
Copper (Cu)	23.50	24.30

"Benzene Hexachloride"

K.N.-404. *Aerovap Insect Refill No. 3*. American Aerovap, Inc., New York, N.Y. Labelled "Active ingredient — gamma isomer of benzene hexachloride from lindane 100%"; not analyzed.

9258, 9259, 9260, 9261. *Benzene Hexachloride Pure Isomers*. Pennsylvania Salt Mfg. Co., Whitemarsh Research Laboratories, Philadelphia, Pa. Melting points were as follows: Alpha, 157-159°C; beta, 308-310°C.; gamma, 112-113°C.; delta, 138-139.5°C.

5078. *C.S.-431*. Manufacturer unknown. Analysis showed benzene hexachloride 6.06 per cent.

5077. *Gamexane 5% in Pyrax*. Manufacturer unknown. Analysis showed benzene hexachloride 3.18 per cent.

9802. *Lindane, Code No. 2992*. Pennsylvania Salt Mfg. Co., Research & Development Dept., Chestnut Hill, Pa. Analysis was as follows: Total chlorine, 72.87 per cent; melting-point, 112-113°C.

990. *Mortron Insecticide*. Exterminator Corp. of America, Philadelphia, Pa. Melting point 110°C.

Bleaches

Forty-six samples of "bleach water" (sodium hypochlorite solution) were examined. Analyses are given in Table 2.

Chlorine Compounds, Organic, Miscellaneous

1672. *Chlordane 50% Wettable Powder*. Manufacturer unknown. Analysis showed 31.82 per cent of organic chlorine, equivalent to 45.98 per cent of chlordane ($C_{10}H_6Cl_8$).

4697. *DDD (50% Wettable Powder)*. Manufacturer unknown. This preparation was not analyzed but was used to prepare a sample of pure DDD by extraction with alcohol and recrystallization of the extract from alcohol. The final product melted at 108-109°C.

9549. *Heptachlorocyclohexane*. Pennsylvania Salt Mfg. Co., Philadelphia, Pa. This product was a mixture, melting between 45° and 120°C; it contained 75.81 per cent of chlorine. Fractionation yielded a mixture of compounds, including two apparently pure heptachlorocyclohexanes, one melting at 84°C. (uncorr.) and possibly identical with Ramsey and Patterson's compound melting at 85-86°C.,¹ and the other melting at 155°C. and possibly identical with the compound of Fuks and Chetverikova melting at 157°C.²

9147. *Koppers Para Dichlorobenzene Crystals*. Koppers Co., Inc., Pittsburgh, Pa. The sample as received contained only a few crystals, but these melted at 53°C. and gave the characteristic infrared spectrum of *p*-dichlorobenzene.

¹J. Assoc. Official Agr. Chem., 29, 337 (1946).

²Zhur. Anal. Khim., 3, 220 (1948).

TABLE 2. ANALYSES OF BLEACHES

No.	Manufacturer and Brand	Sodium Hypochlorite, NaOCl	
		Guaranteed %	Found %
R.W.-338	Bleach-All Laboratories, New London, Conn. <i>Bleach-All.</i>		1.44
R.W.-285	Clean-O Chemical Co., Bronx, N. Y. <i>Clean-O Concentrated Chemical Compound</i>	5.25	6.31
F.S.-778	Clorox Chemical Co., Jersey City, N. J. <i>Clorox Ultra Refined Bleach.</i>	5.25	5.61
F.S.-877	Clorox Chemical Co., Jersey City, N. J. <i>Clorox Ultra Refined Bleach.</i>	5.25	4.41
R.W.-340	Eagle Bleach Water Co., New Haven, Conn. <i>Eagle Grade XX Concentrated Extra Strong Purified Bleach.</i>	7.25	4.53
F.S.-898	Eagle Bleach Water Co., New Haven, Conn. <i>Eagle Washing Compound Grade XX Extra Strong Purified Bleach.</i>	7.25	5.36
F.S.-896	Eagle Bleach Water Co., New Haven, Conn. <i>Eagle Water Bleach-Grade A Double Strength Purified.</i>	3.00	2.15
F.S.-777	Easy Way Products Co., Norwalk, Conn. <i>Easy Way Bleach Compound.</i>	7.25	3.44
R.W.-279	Easy Way Products Co., Norwalk, Conn. <i>Easy Way Bleach Compound.</i>	7.25	4.83
R.W.-280	Easy Way Products Co., Norwalk, Conn. <i>Easy Way Bleach Compound.</i>	7.25	4.93
R.W.-281	Easy Way Products Co., Norwalk, Conn. <i>Easy Way Bleach Compound.</i>	7.25	5.02
R.W.-282	Easy Way Products Co., Norwalk, Conn. <i>Easy Way Bleach Compound.</i>	7.25	5.08
R.W.-283	Easy Way Products Co., Norwalk, Conn. <i>Easy Way Bleach Compound.</i>	7.25	4.69
R.W.-284	Easy Way Products Co., Norwalk, Conn. <i>Easy Way Bleach Compound.</i>	7.25	4.86
K.F.-729	Easy Way Products Co., Stamford, Conn. <i>Easy Way Bleach Germicide Disinfectant.</i>	7.25	6.47
W.S.-29	Ever-White Bleach Products Co., Bridgeport, Conn. <i>Ever-White Bleach Purified.</i>	3.00	2.95 ¹
F.S.-769	Friendly Bleach Co., Hartford, Conn. <i>Friendly Purified Bleach.</i>	3.00	1.21
F.S.-780	Friendly Bleach Co., Hartford, Conn. <i>Friendly Purified Bleach.</i>	3.00	3.02
F.S.-897	Great Atlantic & Pacific Tea Co., New York, N. Y. <i>Bright Sail Laundry Bleach.</i>	5.25	5.04
F.S.-774	Great Atlantic & Pacific Tea Co., New York, N. Y. <i>White Sail Laundry Bleach.</i>	5.25	6.10
4724	Ideal Products, East Haven, Conn. <i>Bleach Water.</i>		2.70 ²

F.S.-882	Made-Rite, East Hartford, Conn.	Made-Rite.	.....	2.17
103	Manufacturer unknown.	Bleach Water.	.....	10.66 ^a
1000	Manufacturer unknown.	Chlorine Water.	.....	0.00 ⁴
2309	Manufacturer unknown.	Bleaching Water.	7-7.5	0.20
2507	Manufacturer unknown.	Hypochlorite Solution.	.....	7.43
8497	Manufacturer unknown.	Bleach.	.....	1.31
9776	Manufacturer unknown.	Bleach Water.	15.00	15.79
9947	Manufacturer unknown.	Bleach Water.	.....	1.89
9961	Manufacturer unknown.	Bleach.	.....	1.87
F.S.-775	J. L. Prescott Co., Passaic, N. J.	Dazzle Bleach.	5.25	3.95
F.S.-784	J. L. Prescott Co., Passaic, N. J.	Dazzle Bleach & Germicide.	5.25	4.66
F.S.-785	J. L. Prescott Co., Passaic, N. J.	Dazzle Bleach & Germicide.	5.25	4.60
F.S.-786	J. L. Prescott Co., Passaic, N. J.	Dazzle Bleach & Germicide.	5.25	3.88
F.S.-787	J. L. Prescott Co., Passaic, N. J.	Dazzle Bleach & Germicide.	5.25	4.89
F.S.-788	J. L. Prescott Co., Passaic, N. J.	Dazzle Bleach & Germicide.	5.25	4.49
F.S.-879	J. L. Prescott Co., Passaic, N. J.	Triple Filtered Dazzle.	5.25	5.02
F.S.-779	P. H. Revell Co., Woburn, Mass.	Silver Cloud Bleach.	5.25	4.58
F.S.-881	P. H. Revell Co., Woburn, Mass.	Silver Cloud Bleach.	5.25	4.03
J.S.-220	Savol Bleach Co., East Hartford, Conn.	Savol Purified Bleach.	3.00	2.87 ^a
F.S.-878	Savol Bleach Co., East Hartford, Conn.	Savol Purified Bleach.	2.25	2.63
F.S.-776	Savol Chemical Co., Inc., East Hartford, Conn.	Savol Purified Bleach.	3.00	2.28
R.W.-339	Spoxx Co., Providence, R. I.	Highly Concentrated Spoxx.	6.00	4.62
F.S.-773	Star Water Mfg. Co., Cheshire, Conn.	Star Water Bleach.	2.75	2.64
F.S.-880	Star Water Mfg. Co., Cheshire, Conn.	Star Water.	2.75	2.56
F.S.-895	Windsor Home Products Co., Windsor, Conn.	"White Line" Purified Bleach.	3.00	2.78

¹Sodium carbonate, 0.85 per cent; no sodium hydroxide.²Sodium hydroxide, 0.43 per cent; sodium carbonate, 0.18 per cent.³Sodium hydroxide, 0.65 per cent; sodium carbonate, 0.21 per cent.⁴Chlorine, 6.23 per cent.⁵Sodium hydroxide, 1.73 per cent.

9550. *Octachlorocyclohexane*. Pennsylvania Salt Mfg. Co., Philadelphia, Pa. This product was a mixture, melting between 65° and 135°C.; it contained 77.44 per cent of chlorine, which is 98.2 per cent of the theoretical value of 78.85 per cent. The infrared spectrum showed no evidence of the presence of hexachloro- or heptachlorocyclohexanes.

3313. *Ortho Dichlorobenzene*, B.P. 176-176.5°C. Manufacturer unknown. Analysis showed 46.95 per cent of chlorine, which is 97 per cent of the theoretical value of 48.26 per cent.

5208. *Technical Methoxychlor*. E. I. du Pont de Nemours & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del. This product was not analyzed but was recrystallized six times from alcohol to yield pure p,p' methoxychlor (melting at 86.0-86.5°C.) to be used for experimental purposes.

3311. *Termite Spray Sample 1*. Manufacturer unknown. Claimed to be two-thirds ortho dichlorobenzene. Analysis showed 1.87 per cent of o-dichlorobenzene, the balance being chiefly kerosene.

3312. *Termite Spray Sample 2*. Manufacturer unknown. Claimed to be two-thirds ortho dichlorobenzene. Analysis showed 0.68 per cent of o-dichlorobenzene, the balance being chiefly kerosene.

Copper Preparations

Six samples of copper preparations were examined. Analyses are given in Table 3.

DDT Preparations

Twenty-six samples of DDT preparations were examined. Analyses are given in Table 4.

Dithiocarbamates

840. *Dust 10% Parzate*. American Sumatra Tobacco Corp., East Hartford, Conn. Zineb: Guaranteed, 6.50 per cent; found, 6.02 per cent.

4693, 4694, and 4695. *Zinc Dithane*. Rohm & Haas Co., Philadelphia, Pa. Percentages of zinc, and percentages of zinc ethylenebisdithiocarbamate ($C_4H_6N_2S_4Zn$) calculated from the zinc, were as follows:

No.	Zinc Per Cent	Zineb Per Cent
4693	22.34	94.22
4694	22.42	94.56
4695	23.22	97.93

Fluorine Compounds

7324. *Kryocide Natural Cryolite*. Pennsylvania Salt Mfg. Co., Philadelphia, Pa. Guaranteed: Active ingredient sodium fluoaluminate, not less than 90 per cent; inert ingredients, not more than 10 per cent; fluorine, not less than 49 per cent. Found: Fluorine, 46.71 per cent.

TABLE 3. ANALYSES OF COPPER PREPARATIONS

Station No.	Manufacturer and Brand	Copper, Cu	
		Guaranteed	Found
7323	Acme White Lead & Color Works, Detroit, Mich. <i>Acme Bordeaux Mixture</i> . Eastern States Faints' Exchange, Inc., West Springfield, Mass. <i>Neutral Copper Fungicide</i> . Insecticide Corporation of American, Medina, N. Y. <i>Copolooid 13</i> . Manufacturer unknown. <i>Copper Solution</i> . Manufacturer unknown. <i>Dry Bordeaux Mixture</i> . Manufacturer unknown. <i>Dry Bordeaux Mixture</i> .	%	%
7325		12.75	12.99
4511		29.00	29.73 ¹
4186		13.00	1.64
4725		.....	11.17
7569		.....	11.82 ²

¹Casein, 8.10 per cent. This preparation is a dry Bordeaux mixture containing added calcium caseinate; when mixed with arsenate of lead, it increased the soluble arsenic content of the arsenate from 0.04 to 0.91 per cent.

²Moisture, 6.93, and calcium, 26.98 per cent.

TABLE 4. ANALYSES OF DDT PREPARATIONS

No.	Manufacturer and Brand	Dichlorodiphenyltrichloroethane	
		% Guaranteed	% Found
6375	Apothecaries Hall Co., Waterbury, Conn. 5% DDT.	5.00	5.42
6331	Apothecaries Hall Co., Waterbury, Conn. DDT - Sulfur Dust - 2 1/2% DDT.	2.50	1.87
1112	E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Deenate 50 W DDT Insecticide.	50.00	 ¹
1379	Eastern States Farmers' Exchange, Inc., West Springfield, Mass. 50% DDT Wettable Powder.	50.00	 ²
1378	General Chemical Co., Baltimore, Md. Genitox S-50, 50% DDT.	50.00	.....
3344	Goulard and Olena, Inc., Skillman, N. J. 10% DDT Dust.	10.00	11.46
3345	Goulard and Olena, Inc., Skillman, N. J. 10%, DDT Dust.	10.00	8.08
R.W.-337	Impco Products Co., Bridgeport, Conn. Impco Fly Paper Impregnated with 10% DDT.	10.00	17.16 ³
7542	Manufacturer unknown. DDT.	25.00	25.34
3952	Manufacturer unknown. 25% DDT Emulsion Concentrate.	10.00	10.74
495	Manufacturer unknown. 10% DDT Dust.	10.00	10.07
627	Manufacturer unknown. 10% DDT Dust.	25.00	23.69
1835	Manufacturer unknown. 25% DDT Liquid Mixture.	.....	35.85 ⁴
5479	Manufacturer unknown. DDT Spray.	5.00	3.80
1576	Manufacturer unknown. DDT Technical.	50.00	46.78
2478	Manufacturer unknown. No. 2 Fuel Oil Containing DDT.	3.00	3.40 ⁵
3064	Manufacturer unknown. 50% Wettable DDT.	10.00	9.68
7172	Michigan Chemical Corp., St. Louis, Mo. Pestmaster with DDT.	.....	3.27
7173	Michigan Chemical Corp., St. Louis, Mo. Pestmaster with DDT.	50.00	49.01
3954	Niagara Sprayer & Chemical Div., Food Machinery Corp., Middleport, N. Y. Niagara L 1188 Dust.	3.00	8.59
106	Niagara Sprayer & Chemical Div., Food Machinery Corp., Middleport, N. Y. Niagara Niatox Crop Spray.	5.00	2.98 ⁶
494	Puritan Mfg. Co., Waterbury, Conn. Powco Brand Sample S. P. No. 10.	10.00	4.73
8531	Ranger Products Co., Inc., New Haven, Conn. Ranger Flea Powder.	5.00	10.03
7019	Rogers & Hubbard Co., Portland, Conn. Hubbard DDT-Sulphur Dust	10.00	.....
8137	Rogers & Hubbard Co., Portland, Conn. Hubbard 10 Powder.	.....	.....
K.N.-281	Sonoco Products Co., Hartsville, N. C. Sonoco DDT Paint, Interior White Flat.	5.00	.....

¹Infrared pattern identical with that of known "Deenate."

²Setting point, 88.3°C.; solubility in benzene, 62.8 gm./100 cc.; solubility in xylene, 54.4 gm./100 cc.; ash, 0.01 per cent.

³Solvent is a mixture of xylene and kerosene.

⁴Copper: Guaranteed, 5.0 per cent; found, 4.81 per cent.

⁵Balance: bentonite.

1039. *Rat Poison Cups*. Manufacturer unknown. Tests for sodium fluoracetate ("1080") positive.

J.S.-45. *Rat Poison*. A. E. Shedd, Norwich, Conn. Analysis showed this to be a 0.22 gm./100 cc. solution of sodium fluoracetate ("1080") colored with nigrosine dye.

R.W.-342. "1080" *Rat Poison*. Manufacturer unknown. Analysis showed that this liquid was not a sodium fluoracetate ("1080") solution but a 0.66 gm./100 cc. solution of arsenic trioxide (As_2O_3) with excess undissolved arsenic trioxide.

Nicotine Preparations

Eight samples of nicotine preparations were examined. Analyses are given in Table 5.

Oil, Mineral

8126. *Cen-Pe-Co Self-Emulsifying Spray Oil*. Central Petroleum Co., Cleveland, Ohio. Constants of the separated oil were as follows:

Saybolt viscosity, 100°F.	146.3 seconds
Saybolt viscosity, 210°F.	43.6 seconds
Viscosity index	113.
Gravity (A. P. I. degrees)	23.
Pour point	-10° F.

Parathion Preparations

Seven samples of parathion preparations were examined. Analyses are given in Table 6.

Pyrethrum Preparations

9194. *Bird Spray*. Manufacturer unknown. Analysis showed this pale yellow liquid to be a kerosene extract of pyrethrum.

1429 and A.F.-1133. *Kaceco Fume-O-Death Insecticide*. Knox Chemical Co., Chicago, Ill. Guaranteed: Active ingredients, 100 per cent. Analysis showed these samples to be kerosene solutions of an organic thiocyanate (probably β -butoxy- β -thiocyanodiethyl ether) and pyrethrum extract, containing 19.2 mgm./100 cc. of pyrethrin I.

J.W.-74. *Mill Creek Insecticide*. Mill Creek Products, Inc., Kansas City, Mo. This was a kerosene base spray containing pyrethrum extract.

J.S.-136. *Mill Creek Products Insecticide B, Code No. 51-132*. Mill Creek Products, Inc., Kansas City, Mo. Guaranteed: Active ingredients 100 per cent—petroleum distillate, ethylene glycol ether of pinene, pyrethrins, hydrogenated rotenone and other cubé resins. Not analyzed.

J.S.-137. *Mill Creek Products Insecticide Water Base Residual Spray*. Mill Creek Products, Inc., Kansas City, Mo. Guaranteed: Active

TABLE 5. ANALYSES OF NICOTINE PREPARATIONS

Station No.	Manufacturer and Brand	Nicotine	
		Guaranteed	Found
		%	%
5634	Cullman Bros., Inc., Hartford, Conn. 1945 Connecticut Shade Tobacco.		1.42
5635	Cullman Bros., Inc., Hartford, Conn. 1945 Connecticut Shade Tobacco.		2.05
1879	S. D'Angelo, New Haven, Conn. Tobacco Washings.		0.06
1906	Goulard & Olena, Inc., Skillman, N. Y. G & O Ground Tobacco Stems.	0.95	0.12
446	B. G. Pratt Co., New York, N. Y. DX with Nicotine.	1	16.29
7604	Tobacco By-Products & Chemical Corp., Inc., Louisville, Ky. Black Leaf 40.	40.00	39.95
7605	Tobacco By-Products & Chemical Corp., Inc., Louisville, Ky. Black Leaf 40.	40.00	39.95
7606	Tobacco By-Products & Chemical Corp., Inc., Louisville, Ky. Black Leaf 40.	40.00	39.72

¹Guaranteed: Active ingredients 99 per cent, inert ingredient water 1 per cent. Sample was a liquid, not completely miscible with water, with an odor resembling pine oil.

TABLE 6. ANALYSES OF PARATHION PREPARATIONS

Station No.	Manufacturer and Brand	Parathion	
		Guaranteed %	Found %
839	American Sumatra Tobacco Corp., East Hartford, Conn. 1% Parathion 10% DDT 10% Parzate Dust.	1.00	1.16 ¹
1503	Bureau of Entomology & Plant Quarantine, U. S. D. A., Beltsville, Md. 25% Parathion Dust.	25.00	23.13
1502	Bureau of Entomology & Plant Quarantine, U. S. D. A., Beltsville, Md. Technical Parathion.		98.04
6022	Farming Div., General Cigar Co., West Hartford, Conn. Parathion - Rotenone Dust.	1.00	0.82
6669	Farming Div., General Cigar Co., West Hartford, Conn. Rotenone - Parathion Dust.	1.18	0.98
3857	Manufacturer unknown. Unknown Insecticide.		14.70
7930	Sherwin-Williams Co., Cleveland, O. Aphanite.	15.00	12.07

¹DDT: Guaranteed, 10 per cent; found, 10.44 per cent. Zineb: Guaranteed, 6.50 per cent; found, 6.09 per cent.

ingredients 20 per cent—petroleum distillate, ethylene glycol ether of pinene, oleic acid, 2-amino-2-methyl-1-propanol, citrus oil, (butylcarbityl)(6-propyl-piperonyl) ether and related chemicals, pyrethrins I and II, soybean oil, hydrogenated rotenone and other cubé resins; inert ingredient, water 80 per cent. Not analyzed.

3921. *Mill-O-Cide Food Insecticide*. Midland Laboratories, Dubuque, Iowa. Analysis showed this to be a kerosene base spray containing an organic thiocyanate and pyrethrum extract, perfumed with oil of wintergreen.

Quaternary Ammonium Compounds

8816 and 9930. *G.S. Sanitizer*. Gerson-Stewart Corp., Cleveland, Ohio. Para-di-isobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride:

Station No.	Guaranteed Per Cent	Found Per Cent
8816	8.	8.23
9930	10.	9.08

324. *No-Roma Disinfectant and Deodorant*. Axton-Cross Co., Cheshire, Conn. Guaranteed: Alkyl-dimethyl-benzyl-ammonium chloride, 10 per cent; inert material (water), not over 90 per cent. Found: Quaternary ammonium chloride, 9.98 per cent.

F.S.-883. *Sparkal, a Germicide Cleanser*. Vokar Products, Waterbury, Conn. Test for quaternary ammonium compounds positive.

Rotenone Preparations

Nineteen samples of rotenone preparations were examined. Analyses are given in Table 7.

Sulphur

Fourteen samples of sulphur were examined. Analyses are given in Table 8.

Thiocyanates

F.S.-875. *Fly-O-Rid*. Homestead Laboratories, Hartford, Conn. Labelled "100% active - contains no inert ingredients." Analysis showed this preparation to be a kerosene solution of a normal organic thiocyanate; no free cyanide was detected.

3977. *Fuller Insecticide Screen Paint*. Fuller Brush Co., Hartford, Conn. Guaranteed: Active ingredients, 100 per cent. Analysis showed this preparation to be a perfumed solution of a normal organic thiocyanate (probably β -butoxy- β -thiocyanodiethyl ether) in lubricating oil.

3483. *Insecticide No. 400*. Connecticut Chemical & Disinfectant Co., Inc., New Haven, Conn. Labelled "This product contains DDT." Analysis showed this preparation to be a kerosene solution of an

TABLE 7. ANALYSES OF ROTENONE PREPARATIONS

Station No.	Manufacturer and Brand	Rotenone	
		Guaranteed	Found
		%	%
3345	Bonide Chemical Co., Inc., Utica, N. Y. Bonide "Supersat" Rotenone Concentrate No. 9.	9.00	7.60 ¹
5969	Derris, Inc., New York, N. Y. $\frac{3}{4}$ % Rotenone Dust.	0.75	0.54 ²
5135	Manufacturer unknown. Pure Ground Derris Root.	4.00	3.90
5136	Manufacturer unknown. 1 Part Derris Root - 3 Parts Bancroft Clay.	1.00	0.85
2711	Manufacturer unknown. 1 % Rotenone Dust - Lot 1.	1.00	0.82
2712	Manufacturer unknown. 1 % Rotenone Dust - Lot 2.	1.00	0.72
2713	Manufacturer unknown. 1 % Rotenone Dust - Lot 3.	1.00	0.87
2714	Manufacturer unknown. 1 % Rotenone Dust - Lot 4.	1.00	0.82
9221	Manufacturer unknown. Rotenone Dust.	1.00	0.67
5100	Manufacturer unknown. Rotenone - Tobacco Dust.	1.10	0.76
5390	Manufacturer unknown. Rotenone - Tobacco Dust.	1.10	1.04
4011	Niagara Sprayer & Chemical Co., Inc., Middleport, N. Y. Niagara C-O-C-S Rotenone Bearing Dust.	0.75	0.44 ³
4466	Seacoast Laboratories, Inc., New York, N. Y. Rotenone Dust.	1.00	0.27
4467	Seacoast Laboratories, Inc., New York, N. Y. Rotenone Dust.	0.75	0.22
4468	Seacoast Laboratories, Inc., New York, N. Y. Rotenone Dust.	0.60	0.23
4469	Seacoast Laboratories, Inc., New York, N. Y. Rotenone Dust.	0.75 ⁴	0.54
4470	Seacoast Laboratories, Inc., New York, N. Y. Rotenone Dust.	0.60 ⁴	0.50
4372	Seacoast Laboratories, Inc., New York, N. Y. Twin Light Dustall 1 %.	1.00	0.36
4680	Seacoast Laboratories, Inc., New York, N. Y. Twin Light Dustall 1 %.	1.00	0.67

¹Solvent is mixture of alpha- and beta-methylnaphthalenes; ash, 0.02 per cent.²2,4-Dichlorophenoxyacetic acid, 0.22 per cent; the filler is clay.³Copper: Guaranteed, 5.00 per cent; found, 5.34 per cent.⁴Guaranteed copper, 2.5 per cent.

TABLE 8. ANALYSES OF SULPHUR

Station No.	Manufacturer and Brand	pH	Sulphur %	Clay %	Calcium Phosphate, $\text{Ca}_3(\text{PO}_4)_2$ %	Calcium Oxide, CaO %	Water and Undetermined %	Wetting Agent	Other Ingredients %
913	California Spray Chemical Co., Watsonville, Calif. <i>Flotox Wettable</i> .	6.5	96.57	0.01	0.83	0.19	1.93	none	
914	Corona Chemical Co., Milwaukee, Wis. <i>Corona Micronized</i> .	7.5	93.97	0.74	0.74	0.41	2.46	present	
917	Dow Chemical Co., Midland, Mich. <i>Mike</i> .	7.5	95.15	0.01	.....	.....	2.64	present	Sodium thiosulfate, 0.16.
921	Eastern States Farmers' Exchange, Inc., West Springfield, Mass. <i>Dry Wettable</i> .	12.2	90.01	1.68	2.12	1.89	2.96	none	
912	Eastern States Farmers' Exchange, Inc., West Springfield, Mass. <i>Wettable Paste</i> .	7.6	70.02	0.99	.....	.....	28.24	present	Zinc oxide, 0.10; chromium, 0.016.
922	General Chemical Co., New York, N. Y. <i>Apple Dritomic</i> .	8.6	85.46	0.62	.....	0.81	2.91	present	Sodium thiosulfate, 9.07.
915	Grasselli Chemical Co., Inc., Cleveland, O. <i>Sulforon X</i> .	6.2	93.90	1.07	.....	.....	2.51	present	Trisodium phosphate, 0.51.
4057	Koppers Co., Pittsburgh, Pa. <i>Flotation</i>.	.....	92.07	.....	.....	.....	.....	present	Ash, 3.99.
919	Koppers Co., Pittsburgh, Pa. <i>Koppers Paste</i> .	7.2	56.59	1.11	.....	.....	39.96	present	Sodium thiosulfate, 0.30; arsenious oxide, 0.15.
916	Niagara Sprayer & Chemical Co., Middleport, N. Y. <i>Kolofog</i> .	6.2	32.05	47.17	.....	.....	12.52	present	
105	Niagara Sprayer & Chemical Co., Middleport, N. Y. <i>Kolospray</i>.	.....	80.62	.....	.....	.....	.....	.....	Ash, 16.43.
911	Sherwin-Williams Co., Cleveland, O. <i>Mulsoid Wettable</i> .	8.7	95.30	0.65	0.74	0.35	1.44	present	Zinc oxide, 0.06; chromium, 0.010.
918	Stauffer Chemical Co., N. Y., N. Y. <i>Magnetic 70 Paste</i> .	7.3	75.90	0.74	.....	.....	22.95	present	
920	Stauffer Chemical Co., N. Y., N. Y. <i>Magnetic Spray</i> .	6.2	97.96	0.05	.....	.....	1.85	none	

organic thiocyanate containing a faint trace of free cyanide; DDT may have been present also, but its presence was not proved.

A.F.-1133. *Kaceco Insecticide*. Manufacturer unknown. Analysis showed this product to be a kerosene solution of a normal organic thiocyanate (probably β -butoxy- β -thiocyanodiethyl ether).

Miscellaneous

8821. *Acco Casein Spreader*. Manufacturer unknown. Analysis showed: Casein, 26.38, and calcium oxide, 45.09 per cent.

6832. *Alkote*. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Analysis showed this preparation to be an aqueous suspension containing 14.08 per cent of a wax and 0.03 per cent of mineral matter (possibly sodium bicarbonate). After four recrystallizations, the wax melted at 76°C. and contained 2.99 per cent of nitrogen; refluxing with alcoholic potash converted it to a neutral nitrogen-free crystalline substance melting at 84°C. These properties are consistent with the wax's being myricyl cyanide, since myricyl cyanide melts at 75°C. and myricyl alcohol melts at 85-88°C.

3346. *Bonide "Supersat" Emulsifier No. 9*. Bonide Chemical Co., Inc., Utica, N. Y. Labelled "Bonide Super Emulsifier No. 9 is composed of several special prepared vegetable ingredient" (sic). Analysis showed it to be a 64 per cent solution of a potassium soap of a sulphonated vegetable oil.

1831. *B-W*. Wyandotte Chemicals Corp., Wyandotte, Mich. Analysis was as follows:

	Per Cent
Sodium hydroxide (NaOH)	84.60
Sodium carbonate (Na ₂ CO ₃)	9.52
Trisodium phosphate (Na ₃ PO ₄ ·12H ₂ O)	5.88

9383 and 9384. *Conco Roach Powder*. Connecticut Chemical & Disinfectant Co., Inc., New Haven, Conn. Guaranteed: Pyrethrins, 0.2 per cent; petroleum hydrocarbons, 4.8 per cent; borax, 50 per cent; pyrophyllite, 45 per cent. Found:

	9383 Per Cent	9384 Per Cent
Boric acid (H ₃ BO ₃)	30.75	32.95
Borax (Na ₂ B ₄ O ₇ ·10H ₂ O)	47.40	50.80
Oil	0.75	7.06

4085. *DN 111*. Dow Chemical Co., Midland, Mich. Analysis showed: Gypsum (CaSO₄·2H₂O), 81.55, and dicyclohexylamine didinitrocyclohexylphenate, 18.45 per cent.

2957. *DuPont Krenite*. E. I. du Pont de Nemours & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del. Guaranteed: Active in-

gredient (sodium dinitro ortho cresylate), not less than 20 per cent; inert ingredients, 80 per cent. Analysis was as follows:

	<i>Per Cent</i>
Sodium dinitrocresylate	24.16
Sodium chromate (Na_2CrO_4)	2.58
Sodium sulphate (Na_2SO_4)	1.34
Wetting agent	present

7068. *Fungicide 100*. Specialties Dept., R. T. Vanderbilt Co., New York, N. Y. Analysis showed this powder to be basic calcium formate.

2190. *Grasselli Spreader Sticker*. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Labelled "U.S. Patent No. 2128973." Analysis was as follows:

	<i>Per Cent</i>
Mineral oil	23.65
Sodium alkyl sulphate	8.02
Diethylene glycol rosin ester and undetermined	35.49
Ethyl alcohol	10.64
Water	22.20

7990. *Helione Orange*. Standard Chemical Products, Inc., Hoboken, N. J. This was a dark red liquid with considerable sediment. Extraction with ether yielded an orange dye, melting at 144°C . after recrystallization from methanol. Sample was probably a mixture of the hydrochlorides of diaminoazobenzene and benzeneazotoluylene diamines.

6833. *Mechling's Filmfast Combined Spreader and Adhesive*. Mechling Bros. Chemicals Division of General Chemical Co., Camden, N. J. Labelled only "This product does not contain lime." Calculated composition from the analysis was as follows:

	<i>Per Cent</i>
Dry skim milk	45
Bentonite	36
Starch	19

9990. *Mole-Nots*. Nott Mfg. Co., Mount Vernon, N. Y. Labelled "Caution: Mole-Nots contain strychnine - a deadly poison." This product consisted of hemp seeds, impregnated with strychnine and dyed with a green basic dye, enclosed in twists of paper.

5485. *Nalco Alumina Hydroxide No. 185*. National Aluminate Corp., Chicago, Ill. Total solids: Guaranteed, 5 per cent; found, 5.65 per cent.

7475. *Orthex*. California Spray - Chemical Corp., Richmond, Calif. Labelled "U. S. Patent 2,056,239." Calculated composition from the analysis was as follows: Kerosene, 31; other mineral oil, 66.71; free fatty acids, 0.42; casein, 0.22; ash, 0.01, and water, 1.64 per cent.

7328. *Orthex Spreader Adhesive*. California Spray Chemical Corp., Richmond, Calif. Labelled "U. S. Patent 2,056,238." Calculated composition from the analysis was as follows: Mineral oil, 72.87; free

fatty acids, 1.74; potassium soap, 2.31; casein, 0.70; non-soap ash, 0.79; undetermined organic matter, 1.99; and water, 19.60 per cent.

7443. *Pastoxine*. Manufacturer unknown. This was supposed to be a preparation containing pathogenic bacteria designed to produce disease in rats. Analysis showed it to be a suspension of red squill in fat, colored green with chromic oxide.

7302. *Renardine*. Gilbertson & Page, Ltd., Hertford, Herts., England. This preparation was intended to keep rabbits away from crops. It was a neutral dark brown liquid with a strong odor of pyridine, immiscible with water. Analysis indicated it to be a solution of crude coal tar in petroleum naphtha.

33. *Roach Powder*. Manufacturer unknown. This was a mixture of borax and pyrethrum.

5460. *Saf-N-Lead*. Sherwin-Williams Co., Cleveland, O. Calculated composition from the analysis was as follows:

	<i>Per Cent</i>
Zinc sulphate ($\text{ZnSO}_4 \cdot \text{H}_2\text{O}$)	69.42
Zinc oxide (ZnO)	0.99
Calcium hydroxide ($\text{Ca}(\text{OH})_2$)	21.05
Water and impurities by difference	8.54

701. *S. N. A. Hormone Spray Powder*. Chipman Chemical Co., Bound Brook, N. J. Labelled "S.N.A. contains naphthalene acetic acid (sodium salt)." Analysis showed 3.19 per cent of sodium alpha-naphthaleneacetate.

8839. *Sodium Selenate*. Manufacturer unknown. Analysis showed: Sodium selenate (Na_2SeO_4), 82.92 per cent.

3294. *Spraylastic*. Sherwin-Williams Co., Cleveland, O. Labelled "An adhesive spreader to mix with insecticides." Analysis indicated it to be a mixture of petroleum oil (80.9 per cent) with a synthetic wetting agent (18.3 per cent) and water (0.8 per cent).

5428. *Z-1 Colloidal*. Colloidal Products Corp., San Francisco, Calif. Labelled "A spreader and deposit builder developed especially for sprays where the use of petroleum oils is not considered advisable. Principal functioning agents: Petroleum sulphonates and combined fatty acids." Analysis was as follows:

	<i>Per Cent</i>
Silica (SiO_2)	55.80
Soap	32.53
"Petroleum sulphonates"	5.41
Water	6.26

